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### Authors

García, Y  
Ferrás, C  
Aguilera, A  
et al.

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Yolanda García, Carlos Ferrás, Adrián Aguilera & Patricia Ávila

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# Usability and Feasibility Study of a Remote Cognitive Behavioral Therapy System with Long-Term Unemployed Women

Yolanda García<sup>a</sup> , Carlos Ferrás<sup>a</sup> , Adrián Aguilera<sup>b</sup> , and Patricia Ávila<sup>b</sup> 

<sup>a</sup>University of Santiago de Compostela, Santiago de Compostela, Spain; <sup>b</sup>University of California, Berkeley, California

## ABSTRACT

We present the results of the use of a cognitive behavioral therapeutic intervention tool to improve the mental, physical, and social health of a group of long-term unemployed women in Spain. Method: We sent automated text messages (SMS) to the mobile phones of long-term unemployed women selected at random from public social services. During a 28-day intervention period, women received four daily automated text messages on her mobile phone on a predetermined hourly schedule. We measured depression symptoms at the start and end of the intervention and we analyzed qualitative data to determine the acceptability of a remote SMS program. Results: Depression symptoms using the Personal Health Questionnaire-9 (PHQ-9), went from an average of 13.8 at baseline to 4.9 at the end of 28 days ( $p = 0.89$ ). One hundred percent of the women reported that they liked receiving the text messages and most found them helpful.

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## KEYWORDS

E-Health; mobile phones; psychosocial therapy; text messages; women

## Introduction

There is a digital divide that excludes those who are disconnected or without access to mobile phones, but also a division of knowledge that excludes those who cannot use their mobile phones for personal development or to improve their quality of life (Sevilla 2007; Travieso & Planella, 2008). As of 2015, according to data from the “International Telecommunication Union,” there are 96.8 mobile subscriptions per 100 inhabitants, more mobile phones than people in developing countries (120.6 per 100 inhabitants) and almost one phone per inhabitant in developing countries (91.8 per 100 inhabitants) (ITU, 2015). Mobile phone use is spreading rapidly around the world and is becoming a universal tool for communication between people. However, there is a gender gap since, as a GSMA Foundation (2015) study indicates, there are more than 1.7 billion women in the world living in low- and middle-income countries who do not have a mobile phone. And, on average,

a woman is 14% less likely to own a mobile phone than a man, which generates a gender disparity of 200 million fewer women than men with a mobile phone. In addition, one in three women in the world have suffered or is enduring some form of violence in her childhood, adolescence or adulthood, according to the World Health Organization. (Barreto, Dimenstein, & Leite, 2013).

From the point of view of social interventions, we must understand that the social work professionals cannot exist as mere facilitators of information or as managers of public aids; social work professionals must direct their intervention activities to achieve the biopsychosocial autonomy of people who are sick, vulnerable, or at risk of exclusion (Colom, 2011; Martín, 2013). Starting from the premise that physical and mental health cannot be separated from social health, we agree with the definition developed by the World Health Organization which ceases to perceive health as the absence of illness to instead define it as a state of physical, mental, and social well-being (WHO, 2016), which emphasizes the social and interdisciplinary nature of medicine. In addition, clinical psychology must be coordinated and supplemented with social work to create prevention and/or rehabilitation methodologies for the sick and/or excluded. As such, the application of technological advances in the field of information and communication to cognitive behavioral therapies is very promising.

Mobile phones can become valuable tools in the dissemination of psychosocial therapies and the use of text messages, also known as short message service (SMS), in therapy can produce detailed and personalized data to help diagnose, treat, prevent, or rehabilitate socially excluded people. Moreover, mobile phones can collect objective data for psychological and social studies (Aguilera, 2015), but should be understood as a work tool used by the psychosocial therapist (Vázquez, Sexto, Rocha, & Aguilera, 2016).

Emerging research on the use of SMS in therapy, highlights the results of case experiments from the perspective of clinical psychology and clinical social work. Researchers have studied online and text messaging interventions for mental health based in cognitive behavioral therapy (Aguilera, Bruehlman-Senecal, Demasi, & Avila, 2017; Aguilera, Schueller, & Leykin, 2015; Campbell, Caine, Connelly, Doub, & Bragg, 2015; Kong, Ells, Camenga, & Krishnan-Sarin, 2014; Proudfoot et al., 2013; Reamer, 2015). Text messages were sent daily to advise, remind, prevent, or obtain information about mood state to patients suffering from depression, anxiety, alcoholism, addiction, and so forth, with the purpose of increasing the effectiveness of the therapy related tasks, improve self-awareness, and help patient progress. Additionally, Lopez (2014, 2015) conducted a case study on the use of the Internet in psychosocial therapies. In one study, 15 therapists were offered a website specifically designed to provide behavioral therapy to their patients. Therapists could access specific videos, audio files, texts, and recordings. Subsequently, the

participating therapists were asked to answer a series of questions related to the experience, which lasted 7 months. This study found that therapists were already using video, teleconferencing, instant messaging, and e-mail with their patients in general, but came to understand that Internet-based communication was particularly effective in treating vulnerable and marginalized populations. However, when this was not the case, therapists only believed in face-to-face contact with the patient.

Mobile communication and SMS can be a powerful tool to reach vulnerable women who could benefit from psychosocial interventions. The objectives of this study are: (a) to present the results of a systematic case study of long-term unemployed women, (b) to offer a reflection on the advantages and limitations of mobile phones in therapies, and (c) to introduce a debate on the orientation and questions that should be formulated in future research in order to develop socially inclusive cognitive behavioral therapies for vulnerable populations.

## **Method**

### ***Participants***

Participants comprised of 21 long-term unemployed women residing in 10 municipalities located in the province of A Coruña in Spain. The women were recruited at random from public social services of the Gobierno Autónomo de Galicia (Xunta de Galicia) using the official records of long-term unemployed women. We conducted an in-person interview with each woman before the start of the intervention in order to inform the women of the characteristics and objectives of the study and obtain informed consent. The average duration of each interview was 30 min. The interview was previously arranged by telephone with the support of the municipal social services offices. We developed a social diagnosis with questions related to health, medical treatments, social and family relationships, professional activities, economics, and physical activity to use in each of the interviews carried out. The information obtained through the interviews was complemented with information extracted from the participants' official records of their social history. One woman was not included after the interview to participate in receiving text messages because we found a high risk of suicide and in two cases the women voluntarily declined to participate in the study.

The women were informed that they would receive automated personal text messages on their mobile phones and that they could respond freely when they deemed it convenient. We informed them that we were not going to engage in dialogue through the messages and that our goal was to provide support, advise, improve their moods, and improve physical and social health, and clarified that our goal was not to find them a job. We informed the women that there were no costs for them to receive the messages and that

the cost of replying to the messages would be refunded at the end of the study. The entire process was in accordance with the guidelines of the Bioethics Committees of the University of Santiago de Compostela and the University of California, Berkeley. The research, method, objectives, and development were reviewed and approved by said Bioethics Committees.

## **Procedure**

We used an automated text-messaging system for psychosocial therapies, HealthySMS ([www.healthysms.org](http://www.healthysms.org)), which has been used with small groups of vulnerable populations in “face-to-face” psychological treatment (Aguilera et al., 2017). We sent four text messages each day for 28 days to each woman’s personal mobile phone during the following hours: 9:00 a.m., 1:00 p.m., 5:00 p.m., and 9:00 p.m. In total, each of the women received 112 text messages. All participants received the same messages. We developed four message banks focused on: thoughts, health, physical activity, and social relations. The message content was developed from the information gathered in the personalized interviews and the social history obtained from official records and included messages asking, advising, and orienting the habits of daily life with the purpose of improving and developing positive and healthy behaviors contrary of those that we identified as negative. We sought to systematize the formulation of messages based on the previous reported experiences with patients of cognitive behavioral therapy at a public, safety net hospital in California (Aguilera et al., 2017). In addition, the programming of message delivery, monitoring, and technical control was carried out outside of Spain.

The text messages were sent in SMS format to ensure that all women participating could receive messages on their phones regardless of Internet connection. We observed that women used Internet connections from their mobile phones through free Wi-Fi systems in very specific places that were only accessed on specific days or hours.

The HealthySMS platform used for the automated delivery of messages had a system of alerts to automatically detect instant possible risks of suicidal or violent behavior by detecting the presence of keywords in message responses. We had prepared a protocol of action by which the detected alerts were to be communicated to the municipal social services to act in correspondence. However, there were no instances of valid suicidal or violent behavior during the intervention period.

In addition to the text messages, there was telephone contact with each of the women at the beginning of the study, at 14 days and at the end of 28 days in order to resolve doubts, create an atmosphere of trust, and administer study measures. We dedicate an average of 15 min of direct telephone contact with each woman (5 min during each contact).

## Analysis

As part of the usability and feasibility study design of therapy system we proceeded with the evaluation of the quantifiable ratios and qualitative responses of the women about their experience and the reception of the messages.

Two questionnaires and two indicators were used to monitor and evaluate the effect of psychosocial therapy through text messages. We used the Personal Health Questionnaire (PHQ-9) to capture mood and symptoms of depression at the beginning and end of the intervention period (28 days). The PHQ-9 questionnaire is a widely validated tool (Kroenke, Spitzer, & Williams, 2001). To evaluate acceptability of the text messages, we developed a Final Text Messages Questionnaire (FTMQ) for each woman to evaluate her experience sending and receiving text messages. We asked questions about the positive and negative aspects of receiving the text messages, the effectiveness of the intervention, opinion about the number of messages received, the changes experienced in their daily life, and their interest in continuing to receive messages after the intervention period. In addition, we also used as an indicator the number of responses provided by each woman and medication adherence scores to measure adherence to medication as prescribed by their doctor.

## Results

### *Sample characteristics*

All participants were experiencing continuous unemployment of at least one year (100%), were an average age of 40.7 years ( $SD = 8.86$ , range = 23–59) and had an average of 1.8 children ( $SD = 1.35$ , range: 0–5). They comprised a heterogeneous group with varying social issues including cases of prostitution (10.5%), drug addiction (10.5%), immigration (47.4%), with cases of women from Brazil, Croatia, Colombia, and Portugal in poverty or social exclusion (89.5%). Fifty eight percent had experienced episodes of gender violence and 37% had recognized mental problems such as bipolar disorder, anxiety, depression, or mental incapacity and received psychiatric or psychological treatment at some point. The women resided mostly in urban areas (79%), either residing in peri-urban areas or small cities. Educational attainment was 84% at the primary level, 5% at the secondary level, and 11% at the university level. Most women were divorced or separated (58%), with 21% married and 21% single. We have been able to observe that the long-term unemployment status of women is directly related to situations of social marginalization and high vulnerability. In general, the participants were women who depended on public sector financial aid and informal paid work outside the legal system, see [Table 1](#). Most were engaged in informal work without

**Table 1.** Sample characteristics.

	<i>N</i> = 19
Continuous unemployment of at least one year (%)	100
Average age (years)	40.7
Average children	01.8
Cases of prostitution (%)	10.5
Cases of drug addiction (%)	10.5
Cases of Immigration (%)	47.4
Poverty or social exclusion (%)	89.5
With episodes of gender violence (%)	58.0
Mental problems (%)	37.0
From urban areas (%)	79.0
Educational primary level (%)	84.0
Educational secondary level (%)	05.0
Educational university level (%)	11.0
With informal work (%)	89.5
With Public Sector financial aid (%)	100

legal recognition (89.5%), such as caring for the elderly or disabled, cleaning homes and commercial premises, and agricultural work and sometimes in prostitution activities associated with drug dependence (10.5%).

### **Depression symptoms**

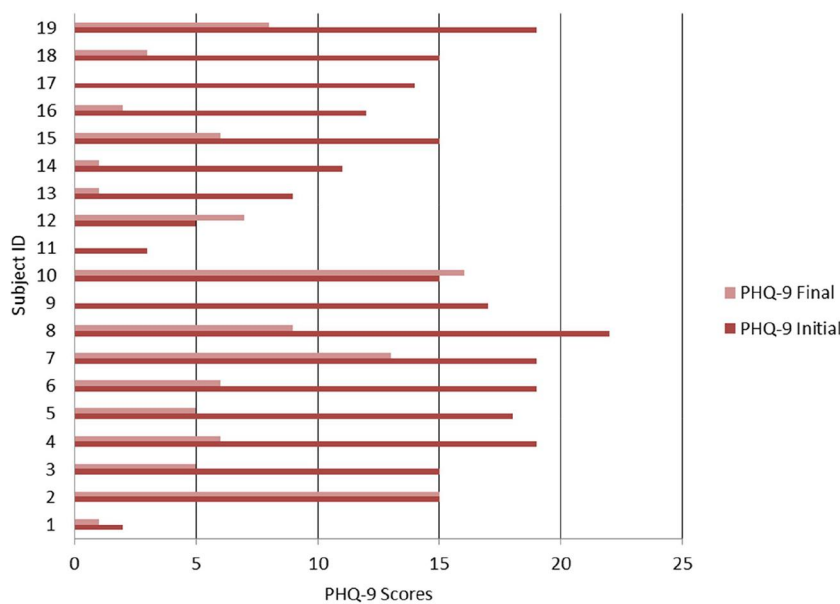
We captured mood and symptoms of depression at the beginning and end of the intervention period (28 days); there were telephone contacts with each of the women in order to administer study measures. The depression symptoms assessed using the Personal Health Questionnaire-9 (PHQ-9) which measures depression severity based on the following scores: 0–4 indicates minimal or none, 5–9 indicate mild, 10–14 indicate moderate, 15–19 indicate moderately severe and scores of 20–27 indicate severe depression (Kroenke et al., 2001). Using a paired samples *t*-test, we found that PHQ-9 scores significantly decreased from an average of 13.8 at baseline (SD = 5.66) to 4.9 (SD = 4.99) [ $t(18) = 6.50$ ,  $p < 0.001$ ] at the end of the 28- day text message intervention (see Figure 1).

### **SMS acceptability**

During the 28-day period of the therapeutic intervention, all women responded to either the text messages or telephone calls ( $n = 19$ ). five women responded only to the telephone calls (26.3%) and 15 responded to the text messages and answered the telephone calls (74.7%). The average number of messages answered per woman was 18.2 (SD = 21.48, range = 2–82). The ratio of responses to the text messages was 74.7% (SD = 21.6%, with a range of 2.7–95.1%).

We used a Final Text Messages Questionnaire (FTMQ) for each woman to evaluate her experience sending and receiving text messages; there was





**Figure 1.** Representation of PHQ-9 initial and final scores by participant.

telephone contact with each of the women at the end of the intervention period. Overall, women found the text messages helpful and were satisfied with the text messages they received. Most of the women indicated that they agreed or strongly agreed with the statement that the therapy received through text messages made them feel more connected with their social environment (68.4%,  $n = 13$ ), had improved their mood (85.2%,  $n = 16$ ), and that they would like to continue receiving messages (89.5%,  $n = 17$ ). Most women indicated that they preferred to receive four or more messages each day (89.5%,  $n = 17$ ), see Table 2. Women who did not respond to the text messages claimed insecurity with their response, not knowing what to say, or the cost of sending messages.

**Table 2.** Final text messages questionnaire (FTMQ).

Feedback questions ( $n = 19$ )	Somewhat disagree	Neutral	Agree	Strongly agree
The messages made you feel more connected with your social environment?	0	31.6% ( $n = 6$ )	42.1% ( $n = 8$ )	26.3% ( $n = 5$ )
The messages improved your mood?	0	15.8% ( $n = 3$ )	52.6% ( $n = 10$ )	31.6% ( $n = 6$ )
Would you like to continue receiving messages?	Yes 89.5% ( $n = 17$ )	No 10.5% ( $n = 2$ )		
What number of messages would you like to receive per day?	2 to 3 10.5% ( $n = 2$ )	4 or more 89.5% ( $n = 17$ )		

The women also provided suggestions for improving the text message program. Two women reported that messages sometimes repeated and that they needed more time to reflect on them to be able to respond. In one case, a woman suggested that she would like to have more direct communication, personalized attention, and dialogue with the therapists. They did not report problems of receiving messages at an inconvenient time or problems with the content of the messages. It should be noted that six women (31.6%) stated that they copied the messages to personal files in order to read them occasionally or to reference them in their daily lives.

Feedback was overwhelmingly positive and held our expectations about the benefits of using text messages in a psychotherapeutic intervention, as can be seen in the Appendix. In general, all of the women (100%) commented that the messages helped them to improve their mood, organize and plan their daily lives, change habits and attitudes, feel accompanied, and advised and improve their social relations in some way. The women commented in three cases that the messages motivated them to do physical exercise or to improve their diet. There were also frequent cases of “thank you” “agreed,” and “okay” responses to the messages.

## Discussion

Our results indicate that a diverse group of long-term unemployed women using social services in the public sector in Spain are receptive to a text message program as part of the therapeutic psychosocial care they receive, and that their depressive symptoms decreased during its use. Such text messages may be particularly important as a key reinforcement or serve as a complement to “face-to-face” therapeutic interventions. SMS or other free systems over the Internet can be well-received technology for users and patients of public health and social services, with the potential to drive results at low economic cost. We have tested this intervention in the public sector, in a secure network of social services, with a group of unemployed women with problems of social exclusion due to low-income, gender violence, prostitution, immigration, or mental disorders. We must bear in mind that this type of excluded population is underrepresented in research on technology and health. Thus, our usability and feasibility study demonstrates that it is worth investing in this technology as a means of achieving results.

The experience we have had in this pilot study with unemployed women has provided us with significant lessons to take into account in future research in this area. We have verified that the use of text messages and personal mobile telephones is universal among women users of social services. Because our study took place in Spain, there was no cost to receive text messages by participants, but there was a cost to sending responses. We refunded the cost of responding to the text messages at the end of the study; however, some

women in our study faced economic barriers to cover the initial cost of sending text message responses. Nevertheless, free messaging systems that send text messages through the Internet to mobile phones through an open Wi-Fi network exist today and can be one solution to overcoming economic barriers to using text messages. Nonetheless, for people of low economic resources, this can be a condition that forces them to look for free Wi-Fi access points, with the associated cost of time or mobility.

Text messages can increase adherence to counseling, guidance, and assigned tasks as part of a face-to-face psychotherapeutic intervention. Interventions can be inclusive in the sense that they can involve family members or key people in the daily lives of these vulnerable women, seeking support for their mood state. In our pilot study, we devoted an average of 30 min for “face-to-face” interviews and 15 min of telephone calls (three) for each of the 19 women, a relatively low cost for a public service of social inclusion. Moreover, the personal interview with each woman participant at the beginning of the study was key, as were the telephone contact at the beginning, middle, and end of the message-sending period. Including a human support allowed for establishing a personal and trustworthy communication that is otherwise difficult to achieve with an intervention using text messages exclusively (Aguilera & Berridge, 2014).

Mobile phones can provide daily data on mood, activities, geographical location, thoughts and feelings, social relationships, eating habits, and so forth, which may be accessed by social workers and therapists through online platforms. Interdisciplinary mental health teams focused on social inclusion should focus on such data provided by long-term unemployed women to define concrete therapeutic objectives. Future interventions should increase the emphasis on outcome evaluation, focusing on the measurement of baseline biopsychosocial symptoms of each unemployed woman and on the therapy system’s performance of characteristics that may be of importance to them.

### **Limitations**

Our study has the limitation of a small sample size. It is a usability and feasibility study and not a formal clinical trial. Therefore, we cannot make general conclusions based on the responses of a diverse group of women, particularly with respect to the cognitive and behavioral changes experienced. Additional research is needed with homogeneous groups with similar characteristics, such as immigrant status, age, acculturation level, geographic context, and social pathology: drug addiction, prostitution, and so forth. In addition, we did not have a control group to establish a point of comparison, which limits the ability to attribute positive results to the text messages. However, positive responses in our feasibility study have provided us with the encouragement to

expand and test text messaging as an improvement of the standards of therapeutic care and social inclusion of public social services.

## Conclusion

The objective of the intervention was to promote the biopsychosocial health of a group of 21 unemployed women with diverse pathology including drug addiction, mental disorders, prostitution, and poverty. The results demonstrate the feasibility of automated text messaging as a tool for disseminating cognitive behavioral interventions. Text messages with advice, guidance, and key accompaniments facilitated women's self-management of mood and the organization and planning of daily activities in this study. We see opportunities for personalized attention, counseling, support, and guidance for vulnerable populations with this text messaging system. The use of text messaging as part of psychosocial and health care can help maximize the resources needed to provide public services in a cost-effective manner. As such, interventions with text messages may have a role in therapy because of the omnipresence of technology. Given the accessibility of mobile phones and the relatively low cost of this form of intervention, more people can benefit from psychosocial and health interventions that encourage positive behavior change. We have found that a reasonable combination of text messages, timely telephone contact, and face-to-face personal interviews are feasible and acceptable to users of public social services. It is important to test whether the use of text messaging technology with the various vulnerable people can improve the outcomes of social and health services. More research and studies are needed with victims of gender violence; people with addictions, mental disorders; groups of women, men, adolescents, or others.

## ORCID

Yolanda García  <http://orcid.org/0000-0001-6397-9795>

Carlos Ferrás  <http://orcid.org/0000-0001-9499-3784>

Adrián Aguilera  <http://orcid.org/0000-0003-1773-8768>

Patricia Ávila  <http://orcid.org/0000-0002-4600-9348>

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## Appendix

### *Qualitative response of women receiving text messages (English/Spanish)*

"I feel accompanied." "Me siento acompañada."

"They help me a lot in bad times." "Me ayudan mucho en los malos momentos."

"Motivation for physical exercise" "Me motivan para el ejercicio físico"

"Bing motivated to do things" "Me motivan para hacer cosas"

"They improve my mood." "Mejoran mi estado de ánimo."

"They help me to reflect." "Me ayudan a reflexionar."

"Motivation and orientation" "Me motivan y orientan"

"They helped me to relate to healthy people." "Me ayudan a relacionar con gente sana."

"They helped me overcome depression and anxiety." "Ayuda con la depresión y ansiedad."

"It improves living with others." "Mejora la convivencia con otros."

"Improves mental focus" "Mejora el enfoque mental"

"I feel connected to someone." "Me siento conectada con alguien."

"The help change your attitude" "Ayuda con el cambio de actitud"

"Improve my relationship with others" "Mejora mis relaciones con otros"

"They help me feel better in the face of depression." "Me ayudan a sentir mejor frente a la depresión."

"I feel accompanied and worried about myself." "Me siento acompañada y preocupada por mí misma."

"Helps change habits" "Ayudan a cambiar los hábitos"

"Improve my eating habits" "Mejoran mis hábitos alimenticios"

"They favor positive relationships." "Favorecen las relaciones positivas."

"They favor the best organization and planning of my things." Favorecen la mejor organización y planificación de mis cosas."

"They motivate me." "Me motivan."

"They advise me." "Me aconsejan."

"Feeling that someone worries about me." "Siento que alguien se preocupa por mí."

"They made me remember." "Me hacen recordar."

"They make me organize, reflect and change my attitude." "Hacen que me organice, reflexione y cambie de actitud."